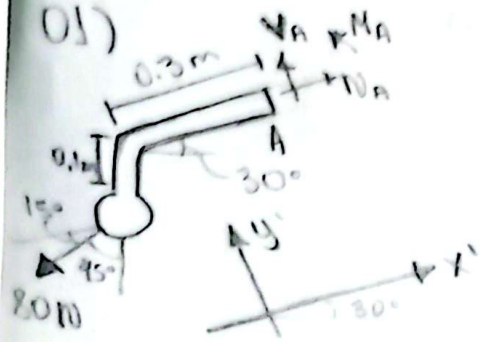
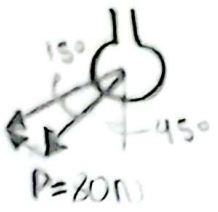
MEC. SOL I

Atividade 1

01)





$\Sigma F_{x'} = 0 \therefore N_A - 80 \cdot \cos(15) = 0 \therefore$

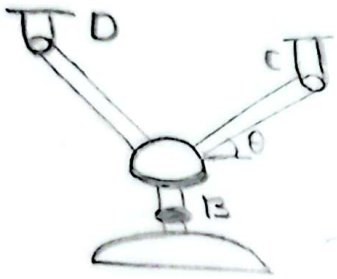
$\Sigma F_{y'} = 0 \therefore V_A - 80 \cdot \text{sen}(15) = 0 \therefore$

$\Sigma M_A = 0$

$M_A - P \cdot \cos 45 \cdot a \cdot \cos(30) - P \cdot \text{sen}(4$

$M_A = -0,555 Nm$

02)



$W = 250N$ $\quad d_B = 9mm$

$\theta = 30°$ $\quad d_C = 6mm$

$\gamma = 45°$ $\quad d_D = 7,5mm$

$\Sigma F_x = 0 ; F_{AC} \cdot \cos\theta - F_{AD} \cdot c$

$\Sigma F_y = 0 ; F_{AC} \cdot \text{sen}\theta + F_{AD} \cdot \text{sen}\gamma$

$\left(\frac{F_{AC}}{F_{AD}}\right) = \left(\frac{183,01}{224,14}\right) N$

$A_{AB} = \frac{\pi \cdot d_B^2}{4} \therefore A_{AB} = 63,62 mm^2$

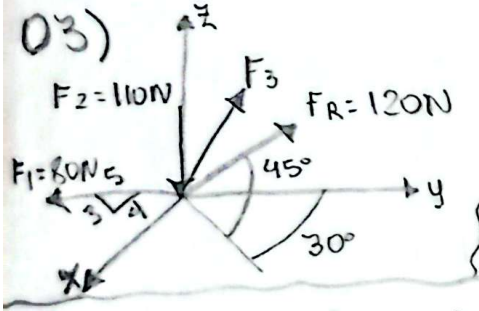
$\sigma_{AB} = \frac{W}{A_{AB}} = 3,93 MPa$

$A_{AD} = \frac{\pi \cdot d_D^2}{4} \therefore A_{AD} = 44,18$

$\sigma_{AD} = \frac{F_{AD}}{A_{AD}} \therefore \sigma_{AD} = 5,074 MP$

$A_{AC} = \frac{\pi \cdot d_C^2}{4} \therefore A_{AC} = 28,27 mm^2 \Rightarrow \sigma_{AC} = \frac{F_{AC}}{A_{AC}} \Rightarrow \sigma_{AC} = 6,47 MPa$

03)



• $F_{RESULTANTE}$:

$F_R = 120\{\cos 45° \text{sen} 30° \hat{i} + \cos 45° \cos 30° \hat{j} + \text{sen} 45° \hat{k}$

$F_R = \{42,43\hat{i} + 73,48\hat{j} + 84,85\hat{k}\} N$

$F_1 = 80\left(\frac{4}{5}\hat{i} + \frac{3}{5}\hat{k}\right) N = \{64,0\hat{i} + 48,0\hat{k}\} N$

$F_2 = \{-$

$F_R = F_1 + F_2 + F_3 \therefore \{42,43\hat{i} + 73,48\hat{j} + 84,85\hat{k}\} = \{(64 + F_{3x})\hat{i} + F_{3y}\hat{j} + (48,0 - 110 + F_3$

• Igualando as componentes:

$F_{3x} = -21,57N \quad F_{3y} = 73,48N \quad F_{3z} = 146,85N \therefore$

• $F_3 = \sqrt{F_{3x} + F_{3y} + F_{3z}}$

$F_3 = 165,62N$

• Ângulos coordenados:

$\cos\alpha = \frac{F_{3x}}{F_3}$ $\quad \cos\beta = \frac{F_{3y}}{F_3}$ $\quad \cos\gamma = \frac{F_{3z}}{F_3}$

$\alpha = 97,5°$ $\quad \beta = 63,7°$ $\quad \gamma = 27,5°$

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